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ABSTRACT

Two experiments investigated 4- to 5-year olds' understanding of semantic relations and methods for incorporating new words into their lexicon. In one experiment, 24 children were shown a picture of a container and told that an object called "X" was hidden inside it. Children were asked questions about the object X and about "Y," which indicated a word that might form an inclusive, overlapping, or mutually exclusive relation with X. An example of an inclusive relation is that between goldfish and fish. An overlapping relation would be that between car and blue, while fork-spoon would constitute a mutually exclusive relation. Children were asked one of two questions: (1) Do you think the hidden object has to be a Y? and (2) Do you think the object could be a Y? Children answered above chance levels with the "could" question. In a second experiment, 24 children played with two balls in two toy dogs. During the play session, the experimenter called one of the dogs a "tiv"; the other dog and the two toys were called "this." In the postest, children were asked "has to" and "could" questions concerning the "tiv." Results indicated that children considered the concept represented by the novel name to be a subset of the concept represented by the familiar name. They formed either a subtype or proper name interpretation. (BC)

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PRESCHOOL CHILDREN'S UNDERSTANDING OF SEMANTIC RELATIONS[1]

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Abstract

This study explores how children understand semantic relations and incorporate new words into their lexicon. A new technique involving the usage of "has to" and "could" questions was designed to differentiate inclusive, overlap, and mutually exclusive relations. Two experiments were conducted each with 24 children aged 4 to 5 years. Results from Experiment 1 showed that children were significantly above chance level in correctly distinguishing the three semantic relations (p's < .01). Experiment 2 showed that when children heard a novel word for an object that has a well-established name, they tended to think that the concept represented by the novel name was a subset of the concept coded by the familiar name. Specifically, they formed either a subtype interpretation or a proper name interpretation.

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Words are semantically related in ways such as inclusion (e.g., bluebird--bird), overlap (e.g., sweater--red), and mutual exclusion (e.g., cat--mouse). When do children form such relations? Which relations do they form when incorporating new words into their lexicon? Taylor and Gelman (1989) found that 2-year-olds tended to form inclusion relations when learning a new word that referred to an object with an already familiar name. For example, when a dog was called a "tiv", children interpreted the new word to refer to the subtype (e.g., terrier). However, due to the young age of their subjects, the possibility of an overlap interpretation was not tested. The present study extends the research to children of 4-5 years of age, and distinguishes all three major potential semantic relations by means of a new technique.

Experiment 1

Subjects

Twenty-four 4- to 5-year olds (mean age = 4:9, range from 4:2 to 5:4).

Procedure

The child was shown a picture of a container, and was told that there was only one hidden object "X" in the container. The child was then asked one of these two questions: "Do you think it has to be a 'Y'?" or "Do you think it could be a 'Y'?" "Y" is a word that might form an inclusive, overlap, or mutually exclusive relation with "X." Each child was asked 12 questions for 12 pairs of words, 6 with "has to", and 6 with "could". Thus no child heard both questions for the same pair. Instead, each "has to" question involving a pair of words was matched with a "could" question involving another pair of words with exactly the same kind of semantic relation (e.g., using "bluebird--bird" with the "has to" question, and using "goldfish--fish" with the "could" question.) Children's understanding of semantic relations was assessed by examining their yes-no patterns of responses across such matched pairs of stimuli.

Insert Table 1 about here

Results and Conclusion

With the exception of using "has to" questions to assess the overlap relation, children were significantly above chance level in correctly answering the questions (p's<.01), suggesting that the "has to" and "could" questions were appropriate for assessing 4- to 5-year-olds' understanding of semantic relations.

Insert Table 2 about here

Experiment 2.

The main purpose of this experiment was to study how children interpret a new word used to refer to an object they already have a name for.

Subjects

Twenty-four 4- to 5-year-olds (mean age = 4:9, range from 4:6 to 5:2).

Procedure

Children first received a shortened version of Experiment 1 as a pretest. They then played with two balls and two toy dogs. Half of the children played with a pair of similar dogs, and the other half with a pair of dissimilar dogs. During the play session, the experimenter talked about each toy six times. One particular dog was referred to as a "tiv" six times (e.g., "Look, here's a 'tiv'."), while the other three toys were called "this." In the testing session, children were asked to perform actions involving a "tiv" or a "dog" (four trials each), so that their interpretation of both words could be inferred. Both the play and testing sessions were adapted from Taylor and Gelman (1989). In the post-test, children were asked, "Do you think a 'tiv' has to be a 'dog'?" and "Do you think a 'tiv' could be a 'dog'?", in order to assess how they interpreted the semantic relation between the two words.

Results

1. As in Experiment 1, children performed fairly well on the pretest.

Insert Table 3 about here

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2. In the post-test, children tended to interpret "tiv" as being included within the category "dog," rather than as overlapping with or being mutually exclusive from "dog." Figure 1 shows the percentage of subjects showing inclusion, overlap, and other response patterns, as a function of different subject selection criteria based on pretest performance. No one showed the mutual exclusion response pattern.

Insert Figure 1 about here

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3. In the testing session, the specific kind of inclusion relation between "tiv" and "dog" was studied. In the four trials when a "tiv" was requested, if a child picked the named dog exclusively, he/she was classified as showing the "proper name response pattern". If a child picked each dog at least once

across the four trials, he/she was classified as showing the "subtype response pattern". Children's responses when a "dog" was requested was classified in the same way. Children who did not show either of these two patterns were classified as "other". It was found that when the named dog and the other dog were of different subtypes, children tended to interpret "tiv" as a proper name. When they were of the same subtype, about half of the children interpreted "tiv" as a subtype, and the other half interpreted "tiv" as a proper name. In contrast, almost all children interpreted "dog" correctly as referring to the entire category.

Insert Table 4 about here

Conclusions

1. A new procedure was devised and found appropriate for testing more directly children's understanding of semantic relations.

2. Consistent with the results of Taylor and Gelman (1989), it was shown that depending on the naming context, children can form inclusion relations when incorporating new words into their lexicon. There was little evidence for the formation of overlap or mutual exclusion relations.

3. Although most of the children formed an inclusion relation, it seems that they formed different kinds of inclusion relations. Some children formed a subtype interpretation, while others formed a proper name interpretation.

Reference

Taylor, M., & Gelman, S. A. (1989). Incorporating new words into the lexicon: Preliminary evidence for language hierarchies in two-year-old children. Child Development, 60, 625-636.

Table 1. Response Patterns to "Has to" and "Could" Questions Showing Different Semantic Relations

Examples "X"--"Y"	Answers to "Has to" Q.	Answers to "could" Q.	Semantic relations
goldfish--fish	Yes	Yes	Inclusion
car--blue	No	Yes	Overlap
fork--spoon	No	No	Exclusion

Table 2. Mean Number of Correct Responses in Experiment 1

	Inclusion	Overlap	Mutual Exclusion
Has to	1.58***	1.08	1.58**
Could	1.76***	1.58***	1.46**
Total	3.34***	2.66***	3.04**

Note: Numbers of correct responses ranged from 0 to 2.0 for the "has to" and the "could " rows, from 0 to 4.0 for "total". The mean numbers were tested (two-tailed *t*-test) against chance level, i.e., 1.0 for "has to" and "could" and 2.0 for "total".

*** p<.001

** p<.01

Table 3. Mean Numbers of Correct Responses in the Pre-test of Experiment 2

	Inclusion	Overlap	Mutual Exclusion
Has to	.58	.58	.79**
Could	.75*	.79**	.71*
Total	1.33+	1.37+	1.50*

Note: Numbers of correct responses ranged from 0 to 1.0 for the "has to" and the "could " rows, from 0 to 2.0 for "total". The mean numbers were tested (two-tailed *t*-test) against chance level, i.e., 0.5 for "has to" and "could" and 1.0 for "total".

** p<.01

* P<.05

+ p<.10

Table 4. Number of Children Showing Each Response Pattern as a Function of Condition.

	Response Pattern		
	Proper Name	Subtype	Other
"tiv"			
Similar exemplars	6	5	1
Dissimilar exemplars	9	3	0
Total	15	8	1
"dog"			
Similar exemplars	0	12	0
Dissimilar exemplars	1	10	1
Total	1	22	1